

WHAT IS CLAIMED IS

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A 1 7 1. A data transfer apparatus for transferring data to a plurality of devices connected by a serial bus, comprising:

5 band width calculation means for calculating a band width necessary for data transfer in a specific device out of the plurality of devices;

first channel ensuring means for ensuring a first channel corresponding to the band width; and

10 first transfer means for performing data transfer about the specific device using the first channel.

2. The apparatus according to claim 1, wherein the specific device is a printer.

3. The apparatus according to claim 2, wherein said  
15 band width calculation means calculates a band width necessary for data transfer in the printer on the basis of a processing speed of the printer.

4. The apparatus according to claim 3, wherein the processing speed of the printer is based on at least one  
20 of a print speed, a print resolution and a printer bit depth.

5. The apparatus according to claim 3, wherein the processing speed of the printer is based on at least one of a main scanning period in printing, the number of  
25 pixels formed in the main scanning period, and the number of bits representing one pixel.

6. The apparatus according to claim 1, further comprising:

second channel ensuring means for ensuring a second channel; and

5 second transfer means for performing data transfer about a device other than the specific device using the second channel.

7. The apparatus according to claim 1, wherein said first transfer means performs isochronous transfer.

10 8. The apparatus according to claim 7, wherein, when no data transfer about the specific device is done, said first transfer means sends invalid data to the first channel.

9. The apparatus according to claim 1, further comprising specific device setting means for setting at least one of the plurality of devices as the specific device.

10. The apparatus according to claim 9, wherein said specific device setting means sets at least two devices as the specific device.

11. The apparatus according to claim 7, further comprising control means for, when a band width necessary for data transfer about a device other than the specific device is not more than a predetermined value, controlling to perform data transfer about the device using the first channel.

12. The apparatus according to claim 11, wherein the predetermined value is half a band width calculated by said band width calculation means.

13. The apparatus according to claim 7, further  
5 comprising control means for, when the number of cycles necessary for data transfer about a device other than the specific device is not more than a predetermined value, controlling to perform data transfer about the device using the first channel.

10 14. The apparatus according to claim 1, further comprising monitoring means for monitoring a usage of the specific device by the first channel, and  
said first channel ensuring means ensures the first channel again in accordance with the usage of the  
15 specific device.

15. The apparatus according to claim 9, further comprising monitoring means for monitoring a usage of the specific device by the first channel, and  
said specific device setting means sets the  
20 specific device again in accordance with the usage of the specific device.

16. The apparatus according to claim 9, further comprising monitoring means for monitoring usages of the plurality of devices, and  
25 said specific device setting means resets the specific device in accordance with the usages of the

plurality of devices.

17. The apparatus according to claim 1, wherein said first channel ensuring means ensures the first channel when the band width is not more than a predetermined value.

18. The apparatus according to claim 1, wherein the serial bus is a bus complying with an IEEE 1394 standard.

19. The apparatus according to claim 1, wherein the serial bus is a bus complying with a USB standard.

20. A data transfer method in a system in which a plurality of devices are connected by a serial bus, comprising:

the band width calculation step of calculating a band width necessary for data transfer in a specific device out of the plurality of devices;

the first channel ensuring step of ensuring a first channel corresponding to the band width; and

the first transfer step of performing data transfer about the specific device using the first channel.

21. The method according to claim 20, wherein the specific device is a printer.

22. The method according to claim 21, wherein the band width calculation step comprises calculating a band width necessary for data transfer in the printer on the basis of a processing speed of the printer.

23. The method according to claim 22, wherein the processing speed of the printer is based on at least one of a print speed, a print resolution and a printer bit depth.
- 5 24. The method according to claim 22, wherein the processing speed of the printer is based on at least one of a main scanning period in printing, the number of pixels formed in the main scanning period, and the number of bits representing one pixel.
- 10 25. The method according to claim 20, comprising:  
the second channel ensuring step of ensuring a second channel; and  
the second transfer step of performing data transfer about a device other than the specific device  
15 using the second channel.
26. The method according to claim 20, wherein the first transfer step comprises performing isochronous transfer.
27. The method according to claim 26, wherein, when no  
20 data transfer about the specific device is done, the first transfer step comprises sending invalid data to the first channel.
28. The method according to claim 20, further comprising the specific device setting step of setting  
25 at least one of the plurality of devices as the specific device.

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29. The method according to claim 28, wherein the specific device setting step comprises setting at least two devices as the specific device.

30. The method according to claim 26, wherein, when a  
5 band width necessary for data transfer about a device other than the specific device is not more than a predetermined value, the first transfer step comprises controlling to perform data transfer about the device using the first channel.

31. The method according to claim 30, wherein the  
10 predetermined value is half a band width calculated in the band width calculation step.

32. The method according to claim 26, wherein, when  
15 the number of cycles necessary for data transfer about a device other than the specific device is not more than a predetermined value, the first transfer step comprises controlling to perform data transfer about the device using the first channel.

33. The method according to claim 20, further  
20 comprising:

the monitoring step of monitoring a usage of the specific device by the first channel; and

the channel re-ensuring step of ensures the first  
25 channel again in accordance with the usage of the specific device.

34. The method according to claim 28, further

comprising:

the monitoring step of monitoring a usage of the specific device by the first channel; and

the device resetting step of resetting a specific  
5 device in the plurality of devices in accordance with the usage of the specific device.

35. The method according to claim 28, further comprising:

the monitoring step of monitoring usages of the  
10 plurality of devices; and

the device resetting step of setting a specific device in the plurality of devices again in accordance with the usages of the plurality of devices.

36. The method according to claim 20, wherein the  
15 first channel ensuring step comprises ensuring the first channel when the band width is not more than a predetermined value.

37. The method according to claim 20, wherein the serial bus is a bus matching or complying with an IEEE  
20 1394 standard.

38. The method according to claim 20, wherein the serial bus is a bus matching or complying with a USB standard.

39. A data transfer system for transferring data  
25 between a plurality of devices connected by a serial bus, comprising:

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band width calculation means for calculating a band width necessary for data transfer in a specific device out of the plurality of devices;

first channel ensuring means for ensuring a first  
5 channel corresponding to the band width; and

first transfer means for performing data transfer about the specific device using the first channel.

40. The system according to claim 39, wherein the specific device is a printer.

10 41. The system according to claim 40, wherein said band width calculation means calculates a band width necessary for data transfer in the printer on the basis of a processing speed of the printer.

42. The system according to claim 41, wherein the  
15 processing speed of the printer is based on at least one of a print speed, a print resolution and a printer bit depth.

43. The system according to claim 41, wherein the processing speed of the printer is based on at least one  
20 of a main scanning period in printing, the number of pixels formed in the main scanning period, and the number of bits representing one pixel.

44. The system according to claim 39, further comprising:

25 second channel ensuring means for ensuring a second channel; and



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second transfer means for performing data transfer about a device other than the specific device using the second channel.

45. The system according to claim 39, wherein said  
5 first transfer means performs isochronous transfer.

46. The system according to claim 45, wherein, when no data transfer about the specific device is done, said first transfer means sends invalid data to the first channel.

10 47. The system according to claim 44, wherein the plurality of devices include a controller, and each means is incorporated in the controller.

48. The system according to claim 47, further comprising specific device setting means for setting at  
15 least one of the plurality of devices other than the controller as the specific device.

49. The system according to claim 48, wherein said specific device setting means sets at least two devices as the specific device.

20 50. The system according to claim 48, wherein the plurality of devices include a printer.

51. The system according to claim 48, wherein the plurality of devices include a personal computer.

52. The system according to claim 45, further  
25 comprising control means for, when a band width necessary for data transfer about a device other than

the specific device is not more than a predetermined value, controlling to perform data transfer about the device using the first channel.

53. The system according to claim 52, wherein the  
5 predetermined value is half a band width calculated by said band width calculation means.

54. The system according to claim 45, further  
comprising control means for, when the number of cycles  
necessary for data transfer about a device other than  
10 the specific device is not more than a predetermined value, controlling to perform data transfer about the device using the first channel.

55. The system according to claim 39, further  
comprising monitoring means for monitoring a usage of  
15 the specific device by the first channel, and

said first channel ensuring means ensures the first channel again in accordance with the usage of the specific device.

56. The system according to claim 48, further  
20 comprising monitoring means for monitoring a usage of the specific device by the first channel, and

said specific device setting means sets the specific device again in accordance with the usage of the specific device.

25 57. The system according to claim 48, further comprising monitoring means for monitoring usages of the

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plurality of devices, and

said specific device setting means resets the specific device in accordance with the usages of the plurality of devices.

5 58. The system according to claim 39, wherein said first channel ensuring means ensures the first channel when the band width is not more than a predetermined value.

10 59. The system according to claim 39, wherein the serial bus is a bus matching or complying with an IEEE 1394 standard.

60. The system according to claim 39, wherein the serial bus is a bus matching or complying with a USB standard.

15 61. A storage medium for storing program codes of data transfer processing in a system in which a plurality of devices are connected by a serial bus, comprising:

20 a code of the band width calculation step of calculating a band width necessary for data transfer in a specific device out of the plurality of devices;

a code of the first channel ensuring step of ensuring a first channel corresponding to the band width; and

25 a code of the first transfer step of performing data transfer about the specific device using the first channel.